

Chapter 5. Analysis of Alternatives to the Proposed Project

The ED includes a range of alternatives to the proposed project, or its location, that could feasibly accomplish the basic objectives of the project and could avoid or substantially lessen one or more of the project-related effects. Sufficient information is provided about each alternative to allow the Commission and the public a meaningful evaluation, analysis, and comparison to the proposed project. CEQA guidelines state the ED need not consider an alternative whose effect can not be reasonably ascertained and whose implementation is remote and speculative, nor be required to consider alternatives which are infeasible. Of those alternatives, the document need examine in detail only the ones that the lead agency determines could feasibly attain most of the basic objectives of the project. The proposed project includes measures that work in combination to reach the goals of the MSFMP. Some of these measures have options that could be selected and inserted instead of or in addition to the recommended options.

Consistent with CEQA and the Commission's certified regulatory program, this Chapter addresses whether implementation of the alternative options could result in a significant or potentially significant environmental impact under CEQA. It is the purpose of this chapter to provide information about each option to allow meaningful evaluation, analysis, and comparison with the proposed project. This will allow the Commission and the public a meaningful evaluation, analysis, and comparison of options.

5.1 The No Project Alternative

The purpose of describing and analyzing the no project alternative (status quo) or current conditions, is to allow decision makers to compare the impacts of approving proposed or alternative project options with the impacts of not approving the proposed or alternative project options.

Some of the no project "alternatives" are currently regulations (A5, D1, O1, F1), and were put in place until a MSFMP could be developed and adopted. These regulations will sunset with the adoption of the MSFMP although the Department recommends continuing some of them (see Chapter 4 Proposed Project). Status quo regulations (D1) prohibit the take of market squid for commercial purposes each week between noon Friday and noon Sunday from Point Conception south to the U.S.-Mexico border. The closure extends an existing squid fishery closure for the same time period north from Point Conception to the California-Oregon border and affects vessels catching squid and vessels using lights to attract squid, and does not apply to those pursuing squid for live-bait purposes. There also is an existing gear restriction (O1) which states that each vessel fishing for squid and lighting for squid will utilize a total of no more than 30,000 watts of light to attract squid at any time and that each vessel fishing for squid or lighting for squid will reduce the light scatter of its fishing operations by shielding the entire filament of each light used to attract squid and orient the illumination directly downward, or provide for the illumination to be completely below the surface of the water. Others regulations (F1) do not require a squid permit when fishing for live bait or for vessels landing or taking market squid not to exceed two tons in a calendar day. Interim regulations set a seasonal harvest limit of 125,000 short tons (A5). Status quo conditions do not propose daily trip limits, capacity goals, or permit transfers, and do not propose any additional time and area closures restrictions as

squid harvest replenishment areas or for seabird protection (C2, H5, K1, L1, M1, G1, P5). There are currently 184 squid vessels and 41 light boats in the fishery (I2).

5.1.1 Effects to Air Quality

Increases in ambient air pollutant levels above NAAQS or CAAQS would not reasonably be expected to occur in the foreseeable future with the no project alternative, based on current plans, and consistent with available infrastructure and community services.

5.1.2 Effects to Water Quality

Short-term and long-term pollution effects will continue at former levels under the no project alternative. Anthropogenic sources of pollution include: point source discharges, dredging activities, surface runoff, thermal discharges and oil/hydrocarbon discharges. The current levels of fishing activities are not anticipated to alter sediment deposition rates except for the short-term effects of bottom disturbance from fishing equipment (e.g., anchors, nets, trawl doors) and the associated increases in suspended sediment and turbidity plumes. However, the market squid fishery can directly affect water quality. In Port Hueneme Harbor, in 1999, several squid boat operators were cited in violation of the Clean Water Act. The CRWQCB of Los Angeles cited these operators for discharging water from squid holding tanks into the harbor. The discharge formed a thick foam surrounding the boats and offloading areas, and levels of nitrate, ammonia, and organic nitrogen well exceeded the established limits. As squid die, ink and ammonia are released, the increased ammonia levels are toxic to most marine life; meanwhile, the ink decomposes, decreasing the dissolved oxygen levels in the surrounding area, which suffocates the remaining organisms (CRWQCB, 2000).

Current impacts of dredging and effects to habitat and organisms at the disposal site will continue. Dredging and disposal of dredged material may adversely affect infaunal and bottom-dwelling organisms at the site by removing immobile organisms, by smothering, such as polychaete worms, and other prey types, or forcing mobile animals, such as fish, to migrate. Benthic plants and animals present prior to a dredge or disposal events are unlikely to re-colonize if the composition of the sediment is drastically different from existing conditions. Turbidity plumes of suspended particulates may reduce light penetration, lower the rate of photosynthesis (e.g. in adjacent eelgrass or kelp beds) and the primary productivity of an aquatic area, if suspended for extended periods of times. If suspended particulates persist, fish may suffer reduced feeding ability, and sensitive habitats, such as submerged aquatic vegetation beds, which provide sources of food and shelter, may be damaged. Toxic metals and organics, pathogens, and viruses absorbed or adsorbed to fine-grained particulates in the material may become biologically available to organisms either in the water column or through food chain processes (PFMC 1998).

Dredging, as well as the equipment used in the process such as pipelines, may damage or destroy spawning, nursery, or other sensitive habitats such as emergent marshes and subaquatic vegetation. Dredging may modify current patterns and water circulation of the habitat by changing the direction or velocity of water flow, water circulation, or otherwise changing the dimensions of the water body traditionally utilized by fish for food, shelter, or reproductive purposes.

Releases of petroleum products and garbage would continue, but not likely increase. The discharge of exploratory drill muds and cuttings can result in varying degrees of change on the sea floor and affect the feeding, nursery, and shelter habitat for various life stages of groundfish and shellfish species that are important to commercial and recreational fishers. Drilling muds and cuttings may adversely affect bottom-dwelling organisms at the site by burial of immobile forms or forcing mobile forms to migrate (PFMC 1998).

The withdrawal of ocean water by offshore water intake structures occurs along the California coast. Water withdrawn for cooling water, or a source of drinking water from desalinization plants, affect organisms through impingement on intake screens, entrainment through the heat-exchange systems, or discharge plumes of both heated and non-heated effluent. The water taken into these plants withdraw most larval and post-larval marine fishery organisms, and some proportion of more advanced life stages (PFMC 1998).

Wastewater effluent and non-point source/stormwater discharges may affect the growth and condition of groundfish, other species of fish, and prey species if high contaminant levels are discharged. Storm water runoff from urban areas is a major source of pollution in coastal waters. Because runoff is an untreated pollution source, it contains high concentrations of contaminants and is a significant health hazard to humans (MMS 2001). If contaminants are present, their effects may be manifested by absorption across gill membranes or through bioaccumulation as a result of consuming contaminated prey. Outfall sediments may alter the composition and abundance of benthic community invertebrates living in or on the sediments. The use of biocides to prevent biofouling or the discharge of brine, as a byproduct of desalinization, can reduce or eliminate the suitability of water bodies for populations of fish species and their prey in the general vicinity of the discharge pipe. Mass emissions of suspended solids, contaminants, and nutrient overloading from these outfalls also may affect submerged aquatic vegetation sites including eelgrass and kelp beds. These beds are frequently utilized by marine species for shelter and protection from predators, and for food by consuming organisms associated with these beds (PFMC 1998).

Effects of water quality on marine organisms and their environment would continue to occur with the no project alternative. While fishing activities are not known to affect salinity, temperature, currents, and dissolved oxygen levels in the ocean, some fishing activities temporarily increase turbidity and the potential to release pollutants adsorbed to the sediments. The full extent of these impacts have not been fully researched. Therefore, effects to water quality would continue with the adoption of the no project alternative.

5.1.3 Effects to Geology

Effects to geology, with the no project alternative, would include the continued minor modifications to the sea floor from net placement and anchor placement. These impacts are generally temporary but could be locally important if unique geological features are permanently damaged. However, effects to geology are not expected as fishing for squid takes place over nearshore sandy bottom areas where squid deposit their egg cases. The current fishing levels are not anticipated to increase erosion processes nor affect slope stability.

5.1.4 Effects to Physical Oceanography

No changes to circulation patterns or oceanographic conditions (e.g., water temperature, dissolved oxygen levels, and salinity) are expected with the no project alternative. Fishing activities have a remote possibility of affecting dissolved oxygen levels if an accident occurred and a full load of squid were discharged into an area with minimal circulation such that the decaying squid process utilized the oxygen in that localized area.

5.1.5 Effects to Coastal Habitat

Fishing activities associated with the no project alternative include discharge of pollutants, physical disturbance of bottom sediments and benthic flora and fauna due to anchoring, net placement, physical displacement and/or disturbance of listed species from their respective habitats, and through the removal of market squid as prey for fish, sea turtles, seabirds, and marine mammals.

The night-lighting activities of the market squid fishery may be impacting several seabird species in the Channel Islands. This would continue with the no project alternative. Artificial night-lighting can be a problem for several seabird species that are nocturnal in colony or foraging habits. The concern over the potential impacts of artificial lights on seabirds in the Channel Islands arose in 1999 when large increases in artificial light intensity levels, associated with night-time squid fishery boat activity, extended throughout the seabird breeding season. Breeding seabirds in California susceptible to inflight strikes include Xantus's murrelet, Cassin's auklet, rhinoceros auklet, all of the storm-petrel species (ashy, black, fork-tailed, and Leach's), and the fledgling chicks of tufted puffins. Additionally, Brown pelicans and other seabirds are affected by the ancillary fishing activities. (e.g., vessel proximity, motor noise, generators, lights, human voices, gunshots, radios, etc.) of the market squid fishery near roosting and breeding sites. Personnel from the Channel Islands National Park Service have reported squid boats fishing as close as 75 to 450 feet (< 1/8 mile) from Anacapa Island, and as many as 12 boats at one time.

To avoid risks to nesting brown pelicans and interactions with other seabird species of concern, status quo regulations include a maximum allowable light wattage and specific requirements for orientation and shielding of lights. However, research has not been conducted to measure the effects of the shielded lights and reduced wattage regulations on seabird rookeries and enforcement is difficult. While these regulations reduce the illumination intensity of each vessel, they do not avoid all impacts to sensitive species, as reduced wattage and shielding still produces light above ambient levels. In addition, the shielded lights and reduced wattage regulations do not avoid interactions with nocturnally active species. Artificial night lighting, associated with the market squid fishery, will continue the impacts documented such as disorientation of these species and collisions with vessels. This issue is discussed in additional detail in the sections on marine and coastal birds.

5.1.6 Effects to Benthic Habitat

Soft and hard-bottom seafloor resources have been, and continue to be, impacted by commercial and recreational fishing activities. Physical disturbances to the soft-bottom habitat from the no project alternative may cause minor changes in localized species abundance or composition from existing fishing activities. Soft-bottom infauna

are expected to rapidly repopulate or recolonize, and changes are expected to be within natural variability for the resources. Squid fishing boats affects the benthic resources by removing marine plants, corals, and sessile organisms, upending rocks, and resuspending sediments and associated pollutants. Existing effects to hard-bottom substrate result in minor changes in species composition and community structure by altering the natural composition of the substrate such as breaking the larger rocks into smaller pieces by trawl gear. Anchors and their chains can crush or smother long-lived animals and break portions of the rock formation. A study conducted in 1995 (MMS 2001) found that hard-bottom communities will not recover to pre-disturbed conditions where substrate has been altered and, instead, a different type of hard substrate community develops. Recovery takes years to decades depending on the complexity of the community being altered.

Through the Department's port sampling program, it was identified that approximately two percent of sampled landings contained squid egg cases. Currently, the type of net used to fish for squid is unregulated, although purse seines used for squid typically do not hang as deep as purse seines used for other species, so contact with the bottom is reduced. Incidental catches of squid eggs and other species increase in the squid fishery when the nets are set in shallower water (less than 22 fathoms), where bottom contact may occur (Lutz and Pendleton 2001). Damage to the substrate, and thus, mortality of squid eggs associated with purse seining for squid has not been quantified. Effects of the no project alternative include disturbance and displacement of fish, temporary loss of prey items, permanent loss of hard-substrate habitat, and alteration of community structure on both a temporary and permanent basis depending on the changes to the benthic habitat.

5.1.7 Effects to Pelagic Habitat

Effects to pelagic habitats would still occur from pollution discharges. The no project alternative project would not change gear types from those that currently exist. In addition, removal of squid would continue to affect the fish, sea turtles, marine and coastal birds, and marine mammals that prey on them.

5.1.8 Effects to Areas of Special Concern

Currently, EFH is affected by non-fishing activities including: dredging, fill, excavation, mining, impoundment, discharge, water diversions, thermal additions, introduction of exotic species, elimination, diminishing, or disruption of the function of EFH, and pollution from point and non-point sources. These would continue with the no project alternative. In addition, fishing activities would continue in sanctuaries, refuges, and reserves as currently permitted by law.

5.1.9 Effects to Protected, Threatened, and Endangered Species

5.1.9.1 Effects to Protected or Listed Marine Mammals

Under this alternative, existing management of the market squid fishery would continue as regulated by the Commission, although some regulations are destined to sunset in the near future. NOAA Fisheries lists the market squid purse seine fishery as Category II fishery, with the short-finned pilot whale listed as the marine mammal species/stock incidentally injured or killed. NOAA Fisheries lists the squid brail (dip net)

fishery as a Class III fishery, a fishery with a remote likelihood of marine mammal interaction or no known serious injuries or mortalities with marine mammals.

Direct Effects

All six species of endangered whales are known to utilize California waters for either feeding or during migrations. There are no reports of squid purse seine fishery-related mortality or serious injury in any of the baleen (suborder Mysticeti) whale stocks including; humpback whale, northern right whale, sei whale, fin whale, and the blue whale in California waters. Subsequently, there are no reports of squid purse seine fishery-related mortality or serious injury in the majority of the toothed (Odontocetes) whales stocks including the listed sperm whale.

There are no reports of squid purse seine fishery-related mortality or serious injury in the Guadalupe fur seal, Steller sea lion, northern elephant seal, or southern sea otter stocks in California waters. There are pinniped rookeries present at several Channel Islands and offshore islands, including Año Nuevo Island and the Farallons, that are subject to disturbance by commercial and recreational fishermen. However, closures have already been enacted to keep fishing boats a reasonable distance offshore from the rookeries to minimize interactions and disturbances, particularly during the pupping and breeding season.

Indirect Effects

Market squid are eaten by a number of cetacean and pinniped species as well as southern sea otters. Their importance in the marine mammal diet varies among species. Although there is information about which prey species are consumed by marine mammals, it is not possible to estimate the total amount of market squid consumed by marine mammals in California waters. Thus, it is not possible to determine the allocation of market squid necessary to sustain marine mammal populations and consequently, makes analysis of whether market squid fishery management practices are having a potentially adverse impact on these species difficult. However, it should be noted that goal of squid fishery management is to maintain a long-term economically viable fishery that matches the level of effort to the health of the resource. Current management regulations include a two-day weekend closure which is precautionary management. In the absence of conclusive biological information upon which to base a quota or other management approach, a two-day per week time period allows for uninterrupted spawning in areas where squid are present. Unlike a seasonal quota or seasonal closure, this measure spreads the escapement out throughout the year, rather than concentrating it at the beginning or end. Current interim management measures also include a seasonal statewide catch limitation which limits landings to a maximum seasonal catch, a research and monitoring program which assists in management of the squid fishery to achieve sustainability, and monitoring of the squid harvest through an egg escapement model at 30 percent.

5.1.9.2 Effects to Listed Marine and Coastal Birds

Direct Effects

Several surface-feeding and scavenging species of seabirds (including gulls, albatrosses, fulmars, and shearwaters) are attracted to fishery operations to feed on bait or discarded targeted species and bycatch. The potential exists for these species

to become entangled resulting in mortality or serious injury. In addition, these species consume squid, which could be an additional attraction to such vessels. Thus, there remains the possibility that the squid purse seine fishery may interact with these species. Since the fishery is not monitored, mortality of these species has not been documented.

There are documented interactions of inflight strikes of ashy storm-petrels and Xantus's murrelets with lighted fishing vessels and other lighted vessels, particularly on dark, foggy nights, in the Channel Islands (Whitworth et al. 1997, McChesney, Naughton, Zeidberg, pers. comm.). Artificial night-lighting can be a problem for several seabird species that are nocturnal in colony or foraging habits. Breeding seabirds in California that are susceptible to inflight strikes include Xantus's murrelet, Cassin's auklet, rhinoceros auklet, all of the storm-petrel species (ashy, black, fork-tailed, and leach's), and the fledgling chicks of tufted puffins. When flying in total darkness, seabirds may become disoriented by and attracted to bright artificial lights (Verheijen 1958, Reed et al. 1985, Telfer et al. 1987). This may cause birds to crash into lighted boats, which can result in direct mortality or result in birds either falling stunned and/or injured into the water or landing on deck (Dick and Donaldson 1978). Injured birds become easy targets for predation after daylight. Storm-petrels (and related petrels and shearwaters) are known to be attracted to and strike lighted longlining vessels, as well as other lighted vessels, fishing at night in the southern hemisphere (Reid, pers. comm., Weimerskirch et al. 2000), lighted vessels at night in Alaska (Canez, Trapp, and Williams, pers. comm.) and Newfoundland (Chardine, pers. comm.), and artificial night-lighting in Hawaii (Reed et al. 1985, Telfer 1987).

In addition, fledglings of the species listed above depart the colony only at night, and hence may become attracted and disoriented by lights and collide with vessels, increasing the normal mortality rates of young-of-the-year, as is documented for fledging petrels and storm-petrels in Hawaii and is a major concern for survival of these species (Byrd et al 1978, Reed et al. 1985, Reed 1987, Telfer et al. 1987, Harrison 1990). Disorientation from lights can cause parent-chick separation of Xantus's murrelets and has been observed in the Channel Islands (Keitt, Kelly, Naughton, McChesney, pers. comm.).

Close to breeding colonies, artificial lighting may result in adult birds avoiding the colony and not returning to their nests to attend their eggs and chicks. Studies have shown that nocturnal seabird species display highly reduced activity levels on moonlit nights when they are apparently more susceptible to predation (Manuwal 1974, Watanuki 1980, Story and Grimmer 1986, Keitt, in review). Even on a moonless night, lighted vessels are capable of increasing light levels at a colony up to moonlight levels. Physics calculations show that one unshielded vessel burning 30,000 watts needs to be about a mile away from a colony to bring the light levels down to moonlight levels and even further to emit levels below moonlight (J. Fajans, pers. comm.). Brad Keitt (Island Conservation and Ecology Group, unpublished data) measured light levels on Middle Anacapa from market squid light boats on 2 April 2000 at full moonlight levels at an estimated distance of one kilometer. From his studies of black-vented shearwaters in Mexico (which are also nocturnal and preyed on by western gulls), he concluded that increased predation of nocturnal birds in the Channel Islands likely occurs with artificial lighting (Keitt pers. comm.). Successive nights of high artificial light levels, in combination with the lunar cycle, close to breeding colonies could disrupt the normal

nesting activities of these birds, resulting in increased predation, nest abandonment, or increased mortality of eggs and chicks.

The concern over the potential impacts of artificial lights on seabirds in the Channel Islands arose in 1999 when large increases in artificial light intensity levels associated with night-time squid fishery boat activity extended throughout the seabird breeding season. The use of bright lights is thought to increase the mortality of Xantus's murrelets and ashy storm-petrel (and equally likely the black storm-petrel, rhinoceros auklet, and Cassin's auklet) nesting in the Channel Islands. In 1999, increased mortality rates of Xantus's murrelets due to predation by barn owls were recorded (Channel Islands National Park, unpublished data). Additionally, western gulls, which are normally diurnal, and a predator of murrelets and storm-petrels, were noted by researchers as more active at night when squid lights were on, and predation rates likely increased over normal levels (Channel Island National Park, unpublished data).

During the 1999 season, higher than average rates of nest abandonment and chick mortality, which could not be explained by other environmental factors, were recorded for California brown pelicans (Gress, unpublished data). Brown pelicans and other seabirds are affected by ancillary fishing activities (e.g., vessel proximity, motor noise, generators, lights, radios, etc.) near roosting and breeding sites. Research has shown that many seabird species are disturbed by events which are out of the ordinary (Manuwal 1978, Anderson and Keith 1980, Carney and Sydeman 1999). This includes not only direct human disturbance, but also loud noises. Disturbances at brown pelican and double-crested cormorant colonies are known to cause nest abandonment and increased egg predation (Ellison and Cleary 1978, Anderson 1988). Increased light levels are known to alter the behavior of diurnal species (e.g., brown pelicans, cormorants, gulls) leading to nest abandonment, and as a result increased egg and chick mortality (Avery 2000, Bower 2000).

Following the 1999 season, the Department and federal agencies, concerned about the brown pelican population recovery and population levels of the Xantus's murrelet and ashy storm-petrel in the Channel Islands, were interested in avoiding any potential new interactions with these birds. To avoid risks to nesting brown pelicans and interactions with other seabird species of concern, the Commission has implemented a maximum allowable light wattage and specific requirements for orientation and shielding of lights for vessels fishing or lighting for squid. The management measures specify: (1) to reduce wattage from any individual vessel to 30,000 kilowatts, and (2) to require the use of shielding for all vessels commercially fishing or landing squid. These interim regulations went into effect 30 May 2000.

However, according to some local wardens, the wording in the regulations for shields is vague and poor for enforcement purposes. Of six tickets written for shield violations, there was only one conviction (for the fishermen who pleaded guilty for not having any shields at all). The other five cases, for angle violations, were rejected by the local District Attorney. Additionally, the wording for wattage cannot be enforced as the regulations state that a maximum wattage rather than a maximum number of bulbs. Fishermen claim that although their wattage may add up to 40,000 watts they are only using 30,000 watts or less (analogous to using a dimmer switch on household lights). Although current regulations specify shielding (shielding of the entire filament of lights used to attract squid and orientation of the illumination directly downward, or provide for

the illumination to be completely below the surface of the water) occasionally shields are not used, they do not cover the entire filament, or they are incorrectly angled.

Research has not been conducted to measure the effects of the shielded lights and reduced wattage regulations on seabird rookeries. While these regulations reduce the illumination intensity of each vessel, they do not avoid all impacts to sensitive species, as reduced wattage and shielding still produces light above ambient levels. At this time, there is no control over the number of squid vessels in any particular area. Since illumination levels are additive, multiple boats close to colonies will cumulatively illuminate islands above normal levels. Personnel from the Channel Islands National Park Service have reported squid boats fishing as close as 75 to 450 feet (< 1/8 mile) from Anacapa Island, and as many as 12 boats at one time. Furthermore, noise associated with squid fishing activities (e.g., engine noise, generators, radios, human voices, gunshots) still has the potential to cause disturbances to breeding seabirds.

In addition, the shielded lights and reduced wattage regulations do not avoid interactions with nocturnally active species. Artificial night lighting, associated with the market squid fishery, can continue to result in disorientation of these species and collisions with vessels. Small amounts of light on vessels in the Channel Islands have been observed to cause disorientation in Xantus's murrelets and their chicks.

The Channel Islands provide important breeding habitat for listed (California brown pelican, snowy plover, and bald eagle), candidate, (Xantus's murrelet), and SSC (ashy storm-petrel, black storm-petrel, rhinoceros auklet, tufted puffin, and double-crested cormorant), and globally rare seabird species (Xantus's murrelet and ashy storm-petrel).

Anacapa and Santa Barbara islands are the only United States breeding sites for the California brown pelican, a federal and state endangered species. The islands also provide nesting habitat for 80 percent of the U.S. population and 33.5 percent of the world's population of breeding Xantus's murrelet (currently petitioned for state and federal listing), and 50 percent of the U.S. population and 41 percent of the world's population of breeding ashy storm-petrel. The only other major nesting site for the ashy storm-petrel, the Farallon Islands, is in decline. The only black storm-petrel colony in the United States is found on Santa Barbara Island. Impacts to the Channel Island populations of these species can have serious, long-term consequences for the survival of these species.

The American Trader Trustee Council, of which the Department is a representative, oversees the compensation for natural resources losses attributable to the American Trader oil spill. Part of their restoration plan is to restore seabird nesting habitat for burrow/crevice and ground nesting nocturnal seabirds on Anacapa Island by eradicating the introduced black rat (efforts conducted in 2002). These efforts at conservation could be negatively countered by lost reproduction as a result of disturbance by large levels of artificial illumination from nearby vessels. Other threats to these species, which all cumulatively contribute to their declining numbers, include: human disturbance in the colony (i.e., entering sea caves), exotic predators, pollution (egg-shell thinning due to DDT still occurs in the Channel Islands), oil spills, and alterations in food availability. Given what we know about the effects of artificial night lighting and human disturbance of colonies for these seabird species, as well as for related species around the world, artificial night lighting associated with the market

squid fishery could significantly impact recovery of these species if it occurs during the breeding season.

Indirect Effects

Market squid are eaten by a number of marine birds. Their importance in the diet varies among species. Although there is information about which prey species are consumed by seabirds, it is not possible to estimate the total amount of market squid consumed by seabirds in California waters. Thus, it is not possible to determine the allocation of market squid necessary to sustain seabird populations and consequently, this makes analysis of whether market squid fishery management practices are having a potentially significant impact on seabirds difficult. However, it should be noted that the goal of squid fishery management is to maintain a long-term economically viable fishery that matches the level of effort to the health of the resource. Current regulations include a two-day weekend closure and a seasonal statewide limit on catch, which are precautionary management measures. In the absence of conclusive biological information upon which to base a quota or other management approach, a two-day per week time period allows for uninterrupted spawning in areas where squid are present. Unlike a seasonal quota or seasonal closure, this measure spreads the escapement out throughout the year, rather than concentrating it at the beginning or end. Current interim management measures also include a seasonal statewide catch limitation (landings cap) which limits landings to a maximum seasonal catch, a research and monitoring program which assists in management of the squid fishery to achieve sustainability, and monitoring of the squid harvest through an egg escapement model at 30 percent.

5.1.9.3 Effects to Marine Turtles

Based on interactions between sea turtles and fish harvesters occurring throughout the world, incidental catch poses a minor threat in habitats utilized by these species, including coastal feeding grounds and migratory corridors that exist along the western United States and Mexico. All gear types, aside from rod and reel have the potential to affect turtles, but would be highly unlikely to result in mortality. Studies of threats to sea turtles in other areas have revealed that the primary threats are incidental take in collisions with fishing boats. Various species of turtles are accidentally taken in several commercial and recreational fisheries including: bottom trawls commonly used by shrimp vessels in the Gulf of California, gill-nets, traps, round nets, haul seines, and beach seines commonly used in inshore and coastal waters of Baja California. It is thought that trawls, tuna purse seines, hook-and-line, driftnets, bottom and surface longlines may kill additional numbers of turtles in different areas of the eastern Pacific. Pollution effects to turtles continue with the no project alternative.

Stranding data from 1990 to 1999 for California indicate an average of 2.1 loggerhead turtles strandings per year. Entanglement and ingestion of marine debris, including abandoned nets, continue to pose a threat to leatherbacks, which seem to have a talent for seeking out and getting tangled in floating lines. There are no documented squid fishery interactions with any of the four species of sea turtles. Studies of threats to sea turtles in other areas have revealed that the primary threats are incidental take in collisions with fishing boats, thus there is the possibility that sea

turtles could be hit by a market squid fishery boat. At present, no significant take of sea turtles is known to occur as a result of market squid fishing activities.

5.1.9.4 Effects to Listed Fish

Market squid, along with anchovy and sardine, are important as forage to many fish including all depleted, threatened, and endangered salmon stocks along the coast. Although it is not currently possible to estimate the total amount of Coastal Pelagic Species (CPS) used as forage by finfish in the California Current ecosystem or the size of CPS populations necessary to sustain predator populations, the CPSFMP, along with the MSFMP, contain the goal of providing adequate forage for dependent species. This goal is implemented through harvest policies that reserve a portion of the biomass as forage for all dependent species. It is doubtful that the no project alternative could reduce the numbers of market squid available as prey items to adult salmon, as fishing activities would continue at current levels.

The market squid fishery does not occur in tidewater goby habitat (low salinity waters in estuaries) and therefore no effects are predicted. No fishing activities occur in salmon spawning or rearing habitats, thus salmonids are not likely to be incidentally taken in squid fishing operations. Through the Department's port sampling program, 1,481 landing samples were collected between October 1998 and September 2001 in California, with 422 observed landings containing incidentally-caught fish and invertebrates. Most of this bycatch was other coastal pelagic species, including Pacific sardine, Pacific mackerel, northern anchovy, and jack mackerel. No salmonid species were reported in the incidental bycatch. At present, no significant take salmonids is known to occur as a result of market squid fishing operations.

5.1.10 Effects to Non-Listed Species

5.1.10.1 Effects to Non-Listed Marine Mammals

Direct Effects

There are no reports of squid purse seine fishery-related mortality or serious injury in any of the baleen whale stocks in California waters. Subsequently, there are no reports of squid purse seine fishery-related mortality or serious injury in the majority of the toothed whales stocks in California waters. The exceptions are in the Delphinidae family, where reports of squid purse seine fishery-related mortality or serious injury in southern California are noted for the short-finned pilot whale and Risso's dolphin. Because offshore bottlenose dolphins are often associated with Risso's dolphins and short-finned pilot whales, they too may experience some serious injury or mortality in the squid purse seine fishery (Heyning et al. 1994). Additionally, Pacific white-sided dolphins, short-beaked and long-beaked common dolphins may also experience interactions with this fishery.

The squid purse seine fishery is listed as Category II under NOAA Fisheries classification, with the short-finned pilot whale listed as the marine mammal species/stock incidentally injured or killed. Although there are historical accounts of serious injury and mortality interactions between the squid purse seine fishery and short-finned pilot whales, sightings of pilot whales have been rare since the 1982 to 1983 El Niño event (Forney et al. 2000). Additionally, some past mortalities represented animals that were intentionally killed to protect catch or gear, rather than

incidental kills in nets and gear. These takes are now illegal under the 1994 Amendment to the MMPA. There are no recent reports of short-finned pilot whale mortalities associated with this fishery, most likely because short-finned pilot whales are no longer common in the areas utilized by the squid purse seine fishery and because the fishery is not monitored. However, there have been anecdotal reports of pilot whale sightings in the vicinity of squid fishing operations during the 1997 to 1998 fishing season. Thus, based on historical accounts of mortality and the fact that the squid purse seine fishery is listed as a Category II fishery, it is possible that the squid purse seine fishery may interact with short-finned pilot whales. The squid brail fishery is considered a Category III fishery, (those with a remote likelihood of marine mammal interaction or no known serious injuries or mortalities with marine mammals), and there are documented pilot whale mortalities associated with brail vessels. But these mortalities likely represented animals that were intentionally killed to protect catch or gear, rather than incidental kills and these takes are now illegal under the 1994 Amendment to the MMPA. Thus, it is possible that the brail squid fishery may interact with short-finned pilot whales.

Additionally, Pacific white-sided dolphins feed on squid at night and primarily occur off California in cold water months. Short-beaked and long-beaked common dolphins also feed on squid at night and can be found off southern California. Thus, these species may experience interactions with the market squid fishery. However, as mentioned above, the fishery is not monitored so recent mortality of these species has not been reported. Additionally, according to NOAA Fisheries (Forney et al. 2000), some past mortalities probably represented animals that were intentionally killed to protect catch or gear, rather than incidental kills, and these takes are now illegal under the 1994 Amendment to the MMPA. Based on historical accounts, distribution, current food habits, and behavior, it is possible that the squid purse seine fishery may interact with Risso's dolphins, offshore bottlenose dolphins, Pacific white-sided dolphins, and short-beaked and long-beaked common dolphins.

There are documented interactions of serious injury and mortality of California sea lions with squid purse seine and squid brail vessels. These mortalities likely represented animals that were intentionally killed to protect catch or gear, rather than incidental kills where the animals became entangled in gear, and such takes are now illegal under the 1994 Amendment to the MMPA. However, the squid purse seine and squid brail fishery may continue to interact with California sea lions. Nonetheless, the total fishery mortality (from all fisheries) and serious injury for the California sea lion stock (estimated to be 1,208 animals) is less than the potential biological removal level (PBR) of 6,591 sea lions (Forney et al. 2000) [see section 3.9.1.1 for a detailed explanation of PBR]. Finally, the majority of sea lion-fishery interactions occur in the gill-net fishery rather than the squid purse seine fishery.

Currently, the squid fishery is not monitored so mortality of sea lions in the squid fishery has not been reported.

5.1.10.2 Effects to Non-Listed Marine and Coastal Birds

Several surface-feeding and scavenging species of seabirds (gulls, albatrosses, fulmars, and shearwaters) are attracted to fishery operations to feed on bait or discarded targeted species and bycatch. The potential exists for these species to become entangled resulting in mortality or serious injury. In addition, these species

consume squid, which could be an additional attraction to such vessels. Thus, we cannot rule out the possibility that the market squid fishery may interact with these species. Currently, the fishery is not monitored so mortality of these species has not been reported.

Artificial night-lighting can be a problem for several seabird species that are nocturnal in colony or foraging habits. Non-listed breeding seabirds in California that are susceptible to inflight strikes include Cassin's auklet, fork-tailed storm-petrel, and Leach's storm-petrel. When flying in total darkness, seabirds may become disoriented by and attracted to bright artificial lights (Verheijen 1958, Reed et al. 1985, Telfer et al. 1987). This may cause birds to crash into lighted boats, which can result in direct mortality or result in birds either falling stunned and/or injured into the water or landing on deck (Dick and Donaldson 1978). Injured birds become easy targets for predation after daylight. Storm-petrels and related petrels and shearwaters are known to be attracted to and strike lighted longlining vessels, as well as other lighted vessels, fishing at night in the southern hemisphere (Reid, pers. comm., Weimerskirch et al. 2000), lighted vessels at night in Alaska (Canez, Trapp, and Williams, pers. comm.) and Newfoundland (Chardine, pers. comm.), and artificial night-lighting in Hawaii (Reed et al. 1985, Telfer 1987).

5.1.10.3 Effects to Non-Listed Fish

Fish continue to be exposed to various pollutants throughout the coastal areas. They also continue to be targeted and incidentally taken in other fisheries. Fish populations could either increase or decrease depending on the effort manifested. Fishing success may be adversely affected for up to 10 days following seismic surveys for oil and gas exploration. The decline in fishing success due to behavioral response may be experienced as far as 10 km from the survey area (MMS 2001). Exploration and development of undeveloped federal leases would continue to have a potential effect on marine organisms and would continue with the no project alternative.

5.1.10.4 Effects to the Market Squid Resource

Market squid (*Loligo opalescens*) is the state's largest fishery by volume. In addition to supporting an important commercial fishery, the market squid resource is important to the recreational fishery and is forage for other fish taken for commercial and recreational purposes, as well as for marine mammals, birds, and other marine life. The growing international market for squid and declining squid production from other parts of the world has resulted in an increased demand for California market squid, which, in turn, has led to newer, larger, and more efficient vessels entering the fishery and increased processing capacity. The recent expansion in the fishery combined with record harvests of market squid may result in overfishing of the resource, damaging the resource, and financially harming those persons engaged in the taking, landing, processing, and sale of market squid. However, there are several status-quo mechanisms in place to protect the squid resource. In October 2001, the Commission established a seasonal harvest limit of 125,000 short tons. The limit was based on the highest recorded seasonal catch level for the fishery (1999 to 2000) and serves to prevent volumetric growth of the fishery should market demand encourage such expansion.

Status quo regulations (FGC §149) prohibit the take of market squid for commercial purposes each week between noon Friday and noon Sunday from Point Conception south to the U.S.-Mexico border. The closure extends an existing squid fishery closure for the same time period north from Point Conception to the California-Oregon border (FGC §8420.5). The regulations affect vessels catching squid and vessels using lights to attract squid, and do not apply to those pursuing squid for live-bait purposes. This precautionary measure was adopted to provide spawning squid at least two nights respite from fishing pressure. Unlike a seasonal quota or closure, this measure spreads the escapement throughout the year, rather than concentrating it during one particular period.

Current status quo does not include a capacity goal for light boats and no permit transfers. The status quo does not propose any additional time and area closures, beyond the weekend closure, or additional gear restrictions. The status quo institutes monitoring the squid fishery through the egg escapement model as a proxy for MSY. Until a defensible estimate of market squid biomass is available, the egg escapement model serves to protect the resource and assure sustainability of the fishery. Further, this method allows supports a harvest limit 118,000 because the spawning stock per recruit is actively being monitored to prevent an overfishing situation to occur.

The status quo continues the existing squid research and monitoring program, including fishery-dependent sampling efforts conducted at ports statewide, ongoing monitoring of catch information, and continuation of independent research contracts, especially those focused on developing management models. Further, the fishery-dependent sampling is critical for real-time monitoring of the market squid fishery through the egg escapement model of 30 percent.

The status quo maintains the logbook system in place by the Department for squid fishing vessels and squid light boats. These records provide valuable catch information and may be essential in modeling the market squid population.

Through the Department's port sampling program, it was identified that approximately two percent of sampled landings contained squid egg cases. However, the 125,000 st cap is to prevent expansion beyond the current fishery and does not take the two percent loss into consideration. Currently, the type of net used to fish for squid is unregulated, although purse seines used for squid typically do not hang as deep as purse seines used for other species, so contact with the bottom is reduced. Incidental catches of squid eggs and other species increase in the squid fishery when the nets are set in shallower water (less than 22 fathoms), where bottom contact may occur (Lutz and Pendleton 2001). Damage to the substrate, and thus, mortality of squid eggs associated with purse seining for squid has not been quantified.

5.1.11 Effects to Land Use and Existing Infrastructure

Development activities within watersheds and in coastal marine areas often affect habitat of market squid and other fish species on both long-term and short-term scales. Runoff of toxins from development sites reduces the quality and quantity of suitable fish habitat by the introduction of pesticides, fertilizers, petrochemicals, and construction chemicals. Sediment runoff can restrict tidal flows and tidal elevations resulting in the loss of important fauna and flora. Shoreline stabilization projects that affect reflective wave energy can impede or accelerate natural movements of sand,

thereby impacting intertidal and sub-tidal habitats (PFMC 1998). Development pressure on coastal areas would continue with the no project alternative.

5.1.12 Effects to Transportation

No additional changes to circulation patterns or transportation corridors are expected with the no-project alternative.

5.1.13 Effects to Noise

No additional changes to noise levels are expected with the no project alternative.

5.1.14 Effects to Utilities

No additional changes to utility usage are expected with the no project alternative.

5.1.15 Effects to Archeology/Paleontology

No additional changes to archaeology are expected with the no project alternative as most fishers would prefer to avoid shipwrecks and the potential for losing or damaging their gear.

5.2 Other Project Alternatives

As stated above, CEQA guidelines state the ED need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative, nor be required to consider alternatives which are infeasible. There are 21 alternative options to the proposed project (see Table 2-4). Four of these options (A6, D2, I5, O2) are infeasible, do not meet the goals and objectives of the MLMA and the MSFMP, or they result in significant environmental impacts under CEQA.

Without seasonal catch limitations (A6), weekend closures (D2), and limited entry (I5) options the fishery is likely to be overfished and the resource damaged. Removal of weekend closures would result in increased fishing effort and interactions with seabirds could increase. Removal of existing gear options regarding shields and light wattage (O2), is likely to result in significant impacts to nesting seabirds at the Channel Islands; including the State and federally protected California brown pelican, the candidate/SSC species Xantus's murrelet, and the SSC ashy storm-petrel. Thus, these options would not accomplish the objectives of the MSFMP, and consequently, they are not discussed any further in this document

Implementation of the other 17 options is not likely to result in significant impacts to the environment, provided the option is not implemented in conjunction with A6, D2, I5, or O2. It is anticipated that options will be selected to collectively prevent significant impacts on environment from occurring as it is the goal of the MSFMP to sustain both the squid population and the marine life that depends on it.

5.2.1 Seasonal Catch Limit of 80,000 tons (A1)

Implementation of option A1 would set a statewide seasonal catch limitation of 80,000 tons. This is below the proposed project seasonal catch limitation of 118,000

tons. Compared to the proposed project, the effects to the environment from this option have the potential to be decreased.

5.2.2 Regional Catch Limit Based on Multi-Year Averages (A3)

Implementation of A3 would establish regional seasonal catch limitations based on a multi-year recent average catch for each region with the assumption that the stock is above B_{MSY} . The regions would be north and south of Point Conception. This option would prevent localized negative ecological effects in the northern region as the entire seasonal catch could not be taken from Monterey Bay (this fishery begins earlier than the southern region). Compared to the proposed project, the effects to the environment from this alternative have the potential to be similar.

5.2.3 Seasonal Catch Limit Based on Environmental Conditions (A4)

Implementation of option A4 would base the seasonal catch limitation on environmental conditions. In a non-El Niño period the seasonal harvest would be 115,000 tons, while during an El Niño period the seasonal harvest would be 11,000 tons. This option is below the proposed project seasonal catch limitation of 118,000 tons. Reducing landings during an El Niño period is likely to decrease fishing effort and lower the potential for interactions between fish, marine turtles, seabirds, and marine mammals. During El Niño periods, the availability and abundance of squid are typically less than in non-El Niño periods. Lowered landings during El Niño periods would potentially benefit species that consume squid as more squid would be available for their consumption. Compared to the proposed project, the effects to the environment from this option have the potential to be decreased.

5.2.4 Establishing Daily Trip Limits (C1)

Implementation of C1 would establish a daily trip limit between 30 tons to 137.8 tons. The current fishery is controlled by market orders and although there are vessels in the current fleet capable of delivering loads well in excess of 60 tons, there is rarely the opportunity to deliver a vessel's full capacity tons because market-imposed trip limits of 30 tons are routine (although a vessel may deliver to more than one processor daily). Processors set the limit at 30 tons because of limited processing and freezing capacity. Market squid are included as part of the CPSFMP as a monitored-only species and the CPSFMP federal guidelines limit CPS finfish harvest to a 137.8 tons daily trip limit. But the majority of the vessels are well under this volume. Compared to the proposed project, the effects to the environment from this alternative have the potential to be similar.

5.2.5 Establish a Permit for Live Bait and Incidental Catch (F2)

Implementation of option F2 is not likely to have any significant ecological effects under CEQA as the take of squid for live bait is considered minor. Compared to the proposed project, the effects to the environment from this option have the potential to be similar.

5.2.6 Close All Waters Within Depths of 100 Fathoms Around San Nicholas Island (G2)

Implementation of G2 is not likely to have significant ecological effects under CEQA as the areas proposed for closure are not currently fished by squid fishermen on a regular basis. This option could benefit those marine mammal, seabird, sea turtle, and fish species who consume squid in the closed areas, as well as the market squid that spawn in the closed areas and incidentally caught species. Compared to the proposed project, the effects to the environment from this option have the potential to be similar.

5.2.7 Capacity Goals for Vessels and Light Boats at 10 Permits Each (H1)

Implementation of H1 would set the capacity goal for both market squid vessel permits and market squid light boat permits at 10 permits each. H1 would establish a capacity goal for market squid vessel permits that produces a highly productive and more specialized fleet. This option assumes that the maximum catch that would ever be possible for each boat is caught on every trip. Compared to the proposed project, the effects to the environment from this option have the potential to be similar.

5.2.8 Capacity Goals for Vessels and Light Boats at 10 Permits Each (H2)

Implementation of H2 would set the capacity goal for both market squid vessel permits and market squid light boat permits at 52 permits each. The capacity goal for market squid brail permits would be 18. Compared to the proposed project, the effects to the environment from this option have the potential to be similar.

5.2.9 Capacity Goals for Vessels and Light Boats at 104 Permits Each (H4)

Implementation of H3 would set would set the capacity goal for both market squid vessel permits and market squid light boat permits at 104 permits each. This would result in a less productive but more diverse fleet. This option assumes that the average catch for each boat continues. The capacity goal for market squid brail permits would be 18. If the vessel fished a maximum of 45 days per season, 104 vessels operating in this manner would land the maximum seasonal catch. Compared to the proposed project, the effects to the environment from this option have the potential to be similar.

5.2.10 Initial Issuance of Market Squid Fleet Permits (I3)

Implementation of I3, allow a permit purchase by any permit holder who held a permit in the first year of the moratorium (239 vessel permits and 62 light boat permits) would result in too many permit holders and would not reduce the number of boats in the fishery, subsequently, the capacity goal would not be met. Compared to the proposed project, the effects to the environment from this option have the potential to be increased.

5.2.11 Initial Issuance of Market Squid Fleet Permits (I4)

Implementation of I4 would increase of the number of transferable market squid vessel, brail, and light boats permits resulting in a longer time period to reach the capacity goal. Compared to the proposed project, the effects to the environment from this option have the potential to be similar.

5.2.12 Market Squid Vessel Permit Transfer Option (K2)

Implementation of option K2 would establish full transferability of market squid vessel permits. This would provide flexibility to meet the needs of the fleet but will not help to achieve the capacity goal. Compared to the proposed project, the effects to the environment from this option have the potential to be similar.

5.2.13 Market Squid Brail Permit Transfer Option (L2)

Implementation of the permit transfer option L2 would establish full transferability of market squid brail permits, provided a 15-ton daily trip limit is implemented. Brail vessels are a minor component of the fleet and do not significantly contribute to fleet capacity. Compared to the proposed project, the effects to the environment from this option have the potential to be similar.

5.2.14 Market Squid Light Boat Permit Transfer Option (M2)

Implementation of the permit transfer option M2 would not significantly increase the capacity. This would only be allowed if the initial number of permits issued is equal to or less than the capacity goal. Compared to the proposed project, the effects to the environment from this option have the potential to be similar.

5.2.15 Establish Areas Closed to Squid Fishing around San Miguel, Anacapa, and Santa Barbara Islands from 1 February through 30 September (P1)

The area closures would be one nautical mile from the high water mark for these islands and would exclude the Channel Island MPAs implemented in April 2003, because no commercial squid fishing is presently allowed in these areas. P1 is the best seabird closure option as it would serve to protect most seabirds that forage in the waters and/or breed on Anacapa, Santa Barbara, and San Miguel islands. Castle Rock and Prince Island, off San Miguel Island, and Santa Barbara Island are considered to be the most important seabird nesting areas in the southern California Bight, in terms of numbers of species and numbers of birds. Anacapa Island supports the largest breeding colony of California brown pelicans in the United States. The majority of the Channel Islands seabirds nest between March and August, however, California brown pelicans have a protracted breeding season which can start as early as January and end as late as October. Ashy storm-petrel nesting is protracted (starts in April) and the majority of chicks fledge in September and October. Xantus's murrelets may visit breeding sites starting in January. The time closure from 1 February to 30 September would incorporate the entire breeding season for most seabird nesting species at these islands. Breeding seabirds would not be susceptible to inflight strikes and colony disturbances with this option.

Implementing P1 is expected to have no significant effects on other environmental factors. Implementation of these closures may result in shift of fishing activities for the southern market squid fleet. However, based on past fishing effort, the effort at the closed areas is considered minimal. Marine species that forage on squid would benefit from an increase in prey forage in the closed areas as would spawning squid. Marine species that negatively interact with the squid fishery would benefit from a lack of interaction in the closed areas. Compared to the proposed project, the effects to other environmental factors from this option have the potential to be decreased.

5.2.16 Establish Areas Closed to Squid Fishing around Anacapa and Santa Barbara Islands from 1 February through 30 September (P2)

The area closure would be one nautical mile from the high water mark for these islands and would exclude the Channel Island MPAs implemented in April 2003, because no commercial squid fishing is presently allowed in these areas. Under option P2, not all seabird colonies in the Channel Islands will receive protection, in particular, Castle Rock off San Miguel Island (Prince Island off San Miguel Island, will receive some protection under the Harris Point State Marine Reserve MPA [no-take]). San Miguel Island supports the only nesting colonies, in the Channel Islands, of rhinoceros auklet and tufted puffin, both SSC (refer to Figure 4.3). San Miguel and Santa Cruz islands provide important habitat for ashly storm-petrels (about 68 percent of the Channel Island population) and Xantus's murrelets (about 18 percent of the Channel Island population) and small numbers of both of these species have been found breeding on Santa Catalina and San Clemente islands. Squid fishing does currently occur off Santa Cruz Island but rarely occurs off San Miguel Island. Closures to light use around Anacapa and Santa Barbara could result in increased night-fishing pressure around Santa Cruz Island and an extension of the fishery to San Miguel Island in non-MPA areas. This could result in negative impacts to seabird species on these islands. However, compared to the proposed project, the level of impact would be less as market squid vessels would be excluded from the closed areas entirely (the proposed project restricts the use of attracting lights at Anacapa and Santa Barbara islands but does not exclude squid fishing). Additionally, the market squid fishing season typically occurs during the winter months, impacts to these other islands would only occur if fishing extended into the breeding season and squid were available in these areas.

Implementation of this option is not expected to negatively affect other environmental factors. Marine species that forage on squid would benefit from an increase in prey forage in the closed areas as would spawning squid. Marine species that negatively interact with the squid fishery would benefit from a lack of interaction in the closed areas. Compared to the proposed project, the effects to other environmental factors from this option have the potential to be similar.

5.2.17 Establish Areas Closed to Squid Fishing Using Attracting Lights around San Miguel, Anacapa, and Santa Barbara Islands from 1 February through 30 September (P3)

The area closure would be one nautical mile from the high water mark for these islands and would exclude the Channel Island MPAs implemented in April 2003, because no commercial squid fishing is presently allowed in these areas. Under option P3, noise associated with squid fishing activities (e.g., engine noise, generators, radios, human voices) still has the potential to cause disturbances to breeding seabirds which require nesting and roosting sites free from human disturbance. At this time, there is no control over the number of squid vessels in any particular area. Research has shown that many seabird species are disturbed by events which are out of the ordinary (Manuwal 1978, Anderson and Keith 1980, Carney and Sydeman 1999). This includes not only direct human disturbance, but also loud noises. Disturbances (including close vessel approach) at California brown pelican, double-crested and Brandt's cormorants, and common murre colonies are known to cause nest abandonment and increased egg predation (Ellison and Cleary 1978, Anderson and Keith 1980, Anderson 1988, Parker

et al. 2000, Rojek and Parker 2000, Parker et al. 2001). In addition, it is likely that some level of artificial lighting will be necessary for squid vessels to conduct their operations safely, even without attracting lights. Artificial night lighting, associated with the market squid fishery, would continue to result in disorientation of these species and collisions with vessels. With no control over the number of vessels in an area, it is possible that multiple boats with operating lights could be close to seabird colonies during sensitive periods in their nesting season. For example, small amounts of light on vessels in the Channel Islands have been observed to cause disorientation in Xantus's murrelets and their chicks when they depart the colony. However, it is assumed that squid fishers will fish in areas not closed to attracting lights rather than attempting to fish without lights in areas closed to attracting lights. Monitoring the squid fishery to determine where the fishery is concentrated after implementation will reinforce this assumption. If this option is chosen, we recommend monitoring of the squid fishery to determine where the fishery is concentrated after implementation. We also recommend monitoring of the squid fishing to determine if noise and other activities associated with the squid fishery is impacting seabird colonies in the Channel Islands. Compared to the proposed project, the level of impact on seabirds would be decreased as market squid vessels would be excluded from San Miguel Island.

Implementation of this option is not expected to negatively effect other environmental factors. Marine species that forage on squid would benefit from an increase in prey forage in the closed areas as would spawning squid. Marine species that negatively interact with the squid fishery would benefit from a lack of interaction in the closed areas. Compared to the proposed project, the effects to other environmental factors from this option have the potential to be similar.